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PUBLICATIONS

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**Publications of the Intelligent
Systems Division (Previously
Robot Systems Division)
Covering the Period
January 1971 - April 1994**

Debra L.F. Russell
Intelligent Systems Division

U.S. DEPARTMENT OF COMMERCE
Technology Administration
National Institute of Standards
and Technology
Bldg. 220 Rm. B124
Gaithersburg, MD 20899

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July 1994



U.S. DEPARTMENT OF COMMERCE
Ronald H. Brown, Secretary

TECHNOLOGY ADMINISTRATION
Mary L. Good, Under Secretary for Technology

**NATIONAL INSTITUTE OF STANDARDS
AND TECHNOLOGY**
Arati Prabhakar, Director

INTRODUCTION

This document consists of a list of publications by the staff of the Intelligent Systems Division, Manufacturing Engineering Laboratory (MEL), National Institute of Standards and Technology (NIST) for the period of January 1971 through April 1994.

Publications cover research done by the division in the areas of intelligent machines and systems, robotics, real-time sensory-interactive control, open-systems architectures, software development techniques, world modeling, construction, mining and automated manufacturing systems.

The division's functional statement is as follows:

Intelligent Systems Division (823): Strives to enhance U. S. Industrial competitiveness through the development and application of intelligent systems technologies; Develops and maintains competence in intelligent machines and systems, robotics, real-time sensory-interactive control, open-system architectures, software development techniques, simulation and modeling, and methods for intelligent system design and testing; Conducts research in techniques for planning and control, world modeling, sensory processing, and interactive graphics for operator interface; Works with industry, universities, and other government agencies to implement pre-commercial prototype, open-system architecture, intelligent control systems for a wide variety of applications; Applies artificial intelligence techniques to real-time sensory-interactive control for computer-integrated manufacturing systems; Supports other NIST laboratories and other government agencies in applications of intelligent systems with high national priority, such as construction, environmental clean-up, transportation systems, mining, and military applications; Develops reference model open-system architectures for intelligent control systems; Develops methodologies for design and implementation of intelligent control systems; Develops methods and tools for software development and testing; Develops and tests measures of performance for intelligent control systems, robots, and intelligent machines; Supports the development of new standards for intelligent machine systems, robots, and automated manufacturing systems.

Performance Measures (823.01): Performs research and development in robot performance characterization, measurement, and analysis; performance measurement standards; stabilized lifting platforms for positioning robots and tools; and robotic cranes for precise positioning of large objects.

Intelligent Controls Group (823.02): Performs research and develops methods for making machines behave intelligently which includes research in robotics, artificial intelligence, planning, task decomposition, servo control, world modeling, sensory processing, and related fields.

Systems Integration Group (823.03): Performs research on integrated robotic control systems for a wide variety of applications including intelligent manufacturing, highway transportation and military robotic programs including development of sensors, off-line programming techniques, sensor-based automatic measurement and control techniques, standard interfaces for subsystems and further adaptations of the NIST Real-time Control System (RCS) architecture.

Sensory Intelligence Group (823.04): Performs research in real-time, sensor-based control of intelligent machines including research topics such as robot vision, active and purposive vision, sensory data fusion, world modeling, real-time planning, mobility and navigation, and multi-sensor integration; develops methods for merging sensory information with prior knowledge for representing information about objects, states, space and time, and for generating intelligent action sequences in real-time.

Unmanned Systems Group (823.05): Performs research in intelligent machine control systems including semi-autonomous, autonomous, and remotely operated vehicles, as well as, other intelligent automated systems; develops system integration methods and standards for real-time intelligent machine systems; and develops simulation, modeling, and animation systems for evaluating the performance of intelligent machine systems and for visualizing operational scenarios.

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